CLAIMS

What is claimed is:

1. A method for performing a virtual endoscopy, comprising:

calculating a distance map using three-dimensional (3D) data of a lumen;

calculating a multiplanar reconstruction (MPR) of the lumen;

performing a region growing on the MPR of the lumen;

marking data from the region growing; and

performing a 3D rendering of the marked data from the region growing.

2. The method of claim 1, further comprising:

acquiring the 3D data from the lumen.

3. The method of claim 2, wherein the 3D data is acquired by one of computed tomographic (CT), helical CT, x-ray, positron emission tomographic, fluoroscopic, ultrasound, and magnetic resonance (MR) imaging techniques.

4. The method of claim 1, wherein the lumen is one of a colon, a pancreas, a bronchi, a larynx, a trachea, a sinus, an ear canal, a blood vessel, a urethra and a bladder.

5. The method of claim 1, wherein the MPR is calculated orthogonal to the lumen.

6. The method of claim 1, wherein the MPR is calculated at an endoscope position.

7. The method of claim 1, wherein the region growing is performed at the endoscope position.

8. The method of claim 1, wherein the 3D rendering of the region associated with the region growing is performed using one of raycasting, surface rendering and volume rendering 3D rendering techniques.

9. A method for performing a virtual endoscopy, comprising:

calculating a distance map using three-dimensional (3D) data of a lumen;

calculating a multiplanar reconstruction (MPR) of the lumen, wherein the MPR is calculated orthogonal to the lumen at an endoscope position;

performing a first region growing on the MPR of the lumen at the endoscope position;

calculating a minimum distance and a maximum distance from data of the first region growing using corresponding distances from the distance map;

performing a second region growing on the MPR of the lumen for data outside the first region growing; and

performing a 3D rendering of data associated with the first region growing and the second region growing.

10. The method of claim 9, further comprising:

acquiring the 3D data from the lumen.

11. The method of claim 10, wherein the 3D data is acquired by one of computed tomographic (CT), helical CT, x-ray, positron emission tomographic, fluoroscopic, ultrasound, and magnetic resonance (MR) imaging techniques.

12. The method of claim 9, further comprising:

marking data from the first region growing to be rendered.

13. The method of claim 9, further comprising:

marking data from the second region growing to be rendered.

14. The method of claim 9, wherein the lumen is one of a colon, a pancreas, a bronchi, a larynx, a trachea, a sinus, an ear canal, a blood vessel, a urethra and a bladder.

15. The method of claim 9, wherein the 3D rendering of the data associated with the first region growing and the second region growing is performed using one of raycasting, surface rendering and volume rendering 3D rendering techniques.

16. The method of claim 9, wherein the second region growing is performed within a threshold associated with the calculated minimum and maximum distances.

17. A system for performing a virtual endoscopy, comprising:

a memory device for storing a program;

a processor in communication with the memory device, the processor operative with the program to:

calculate a distance map using three-dimensional (3D) data of a lumen;

calculate a multiplanar reconstruction (MPR) of the lumen, wherein the MPR is calculated orthogonal to the lumen at an endoscope position;

perform a first region growing on the MPR of the lumen at the endoscope position;

calculate a minimum distance and a maximum distance from data of the first region growing using corresponding distances from the distance map;

perform a second region growing on the MPR of the lumen for data outside the first region growing; and

perform a 3D rendering of data associated with the first region growing and the second region growing.

18. The system of claim 17, wherein the processor is further operative with the program code to:

acquire the 3D data of the lumen.

19. The system of claim 18, wherein the 3D data is acquired by a scanning device using one of computed tomographic (CT), helical CT, x-ray, positron emission tomographic, fluoroscopic, ultrasound, and magnetic resonance (MR) imaging techniques.

20. The system of claim 17, wherein the data associated with the first region growing and the second region growing is marked.

21. The system of claim 17, wherein the processor is further operative with the program code to:

display an image resulting from the 3D rendering of the data associated with the first region growing and the second region growing.

22. The system of claim 21, wherein the image is displayed by a display device.

23. A computer program product comprising a computer useable medium having computer program logic recorded thereon for performing a virtual endoscopy, the computer program logic comprising:

program code for calculating a distance map using three-dimensional (3D) data of a lumen;

program code for calculating a multiplanar reconstruction (MPR) of the lumen, wherein the MPR is calculated orthogonal to the lumen at an endoscope position;

program code for performing a first region growing on the MPR of the lumen at the endoscope position;

program code for calculating a minimum distance and a maximum distance from data of the first region growing using corresponding distances from the distance map;

program code for performing a second region growing on the MPR of the lumen for data outside the first region growing; and

program code for performing a 3D rendering of data associated with the first region growing and the second region growing.

24. The system of claim 23, further comprising:

program code for acquiring the 3D data from the lumen.

25. The system of claim 24, wherein the 3D data is acquired by one of computed tomographic (CT), helical CT, x-ray, positron emission tomographic, fluoroscopic, ultrasound, and magnetic resonance (MR) imaging techniques.

26. The system of claim 23, wherein the lumen is one of a colon, a pancreas, a bronchi, a larynx, a trachea, a sinus, an ear canal, a blood vessel, a urethra and a bladder.

27. The system of claim 23, wherein the 3D rendering of the data associated with the first region growing and the second region growing is performed using one of raycasting, surface rendering and volume rendering 3D rendering techniques.

28. A system for performing a virtual endoscopy, comprising:

means for calculating a distance map using three-dimensional (3D) data of a lumen;

means for calculating a multiplanar reconstruction (MPR) of the lumen, wherein the MPR is calculated orthogonal to the lumen at an endoscope position;

means for performing a first region growing on the MPR of the lumen at the endoscope position;

means for calculating a minimum distance and a maximum distance from data of the first region growing using corresponding distances from the distance map;

means for performing a second region growing on the MPR of the lumen for data outside the first region growing; and

means for performing a 3D rendering of data associated with the first region growing and the second region growing.

29. A method for performing a virtual endoscopy, comprising:

acquiring three-dimensional (3D) data from a lumen;

calculating a distance map using the 3D data of the lumen;

positioning an endoscope at a desired position in the lumen;

calculating a multiplanar reconstruction (MPR) of the lumen, wherein the MPR is calculated orthogonal to the lumen at the endoscope position;

performing a first region growing on the MPR of the lumen at the endoscope position;

marking data associated with the first region growing for rendering;

calculating a minimum distance and a maximum distance from the marked data of the first region growing using corresponding distances from the distance map;

performing a plurality of region growings for data outside the marked data region that is within a threshold associated with the calculation of the minimum and maximum distances of data;

marking data associated with the plurality of region growings for rendering; and

performing a 3D rendering of the marked regions associated with the first growing and the plurality of region growings.

30. The method of claim 29, wherein the plurality of region growings are performed until all data outside the marked data region that is within the threshold has been subjected to at least one of the plurality of region growings.